

Notice of Allowability	Application No.	Applicant(s)	
	10/823,771	APOSTOLO ET AL.	
	Examiner	Art Unit	
	Henry S. Hu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment of October 2, 2006.
2. ☒ The allowed claim(s) is/are 14-37.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee. Authorization for this examiner's amendment was given in two telephone interviews with **Richard J. Berman** (Registration No. 39,107) (tel. 202 857-6000) on December 4 and 6, 2006 to cancel non-elected Claims 1-13 (Groups I and II) as well as to amend claims as following:

CLAIMS

Claims 1-13 please cancel Claims 1-13

Claim 14 at line 2 please replace the word of "polymers" with "homopolymers"

Claim 14 at line 7 please replace the phrase of " R_F or OR_F " with the word of " OR_F "

Claim 14 at line 10 please replace the phrase of "fluorinated polymers" with the phrase of "perfluorinated homopolymers"

Claim 14 at lines 16-17 delete two whole lines of "in the IR spectrum.....and 1900-1830 cm^{-1} "

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Claim 15 at line 3 please replace the word of “polymers” with “homopolymers”

Claim 16 at line 2 please replace the word of “polymers” with “perfluorinated homopolymers and copolymers”

Claim 17 at line 2 please replace the word of “polymers” with “homopolymers and copolymers”

Claim 18 at line 2 please replace the word of “polymers” with “homopolymers”

Claim 18 at line 8 please replace the phrase of “ R_F or OR_F ” with the word of “ OR_F ”

Claim 18 at line 11 please replace the phrase of “fluorinated polymers” with the phrase of “perfluorinated homopolymers”

Claim 19 at line 3 please replace the word of “polymers” with “perfluorinated homopolymers and copolymers”

Claim 20 at line 2 please replace the word of “polymers” with “homopolymers and copolymers”

Claim 23 at line 1 please delete the phrase of “or 18”

Claim 23 at line 2 please delete the word of “(TTD)”

DETAILED ACTION

2. This Office Action is in response to **Amendment** filed on October 2, 2006. With Applicants' amendment in response to non-final office action of June 2, 2006, **Claims 1, 4-5, 7, 9, 11 and 13-20 were amended, while new Claims 21-37 were added.** To be more specific, **Claims 14 and 18 were both rewritten as process of using in an independent form so as to incorporate the limitations from both Claims 1 and 10.** The Applicants allege that support for claim amendment and addition can be found on page 11 of Remarks.

Applicants have removed the improper language "preferably" on Claims 1, 4, 7, 13 and 15-16. Applicants' terminal disclaimer (**TD**) filed on October 2, 2006 was approved on October 16, 2006. The examiner thereby withdraws claim objection, ODP claim rejection and 112-2nd rejection for "the use" claim in the previous Office Action dated June 2, 2006.

With above Examiner's Amendment, non-elected Claims 1-4 and 9-13 (Group I) and Claims 5-8 (Group II) are all cancelled, while a clear language of "homopolymer" is applied on two parent Claims 14 and 18 since it is together with the language of "copolymer". Applicants also remove the R_F from the R_F factor and limit R_F to be OR_F only in two independent Claims 14 and 18. **Claims 14-37 are now pending with a total of two independent claims (Claim 14 and Claim 18).** An action follows.

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3. Claim rejections under Non-Final Office Action filed on June 2, 2006 are now removed for the reasons given in paragraphs 4-11 thereafter.

Allowable Subject Matter

4. Claims 14-37 are allowed.
5. The following is an examiner's statement of reasons for allowance: The above Claims 14-37 are allowed over the closest references:
6. *The limitation of parent Claim 14 of the present invention relates to a method of preparing coatings wherein amorphous perfluorinated homopolymers and copolymers of perfluorodioxoles of formula (IA) as specified are used. Said perfluorinated polymers are related to homo- and co-polymers carrying three required properties as: (A) at least 95 mol% of dioxole content, (B) Tg in the range of 180-195 °C, and (C) intrinsic viscosity as specified.*
- Other parent Claim 18 relates to a method of preparing films and membranes for gas separation wherein amorphous perfluorinated homopolymers and copolymers of perfluorodioxoles of formula (IA) as specified in Claim 14 are used. See other limitations of dependent Claims 15-17 and 19-37.*
7. Applicant has claimed now in each of two parent Claims 14 and 18 (amended three times) an unexpected way of obtaining amorphous perfluorinated homopolymers and

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copolymers of perfluorodioxoles of formula (IA) as specified to be used for coating purpose.

Such polymer carries a combination of **three required properties** as: (A) **at least 95 mol% of dioxole content**, (B) **Tg in the range of 180-195 °C**, and (C) **intrinsic viscosity** as specified.

With Examiner's Amendment, Applicants have removed the R_F species from the $R_{F'}$ factor so that $R_{F'}$ is limited to be OR_F in two independent Claims 14 and 18.

With respect to **ether-linkaged dioxole** with $R_{F'}$ being OR_F , such obtained perfluorinated homopolymers and copolymers carrying such a combination of three properties are found to be novel. Although Navarrini in each of US ("223" and "028") and EP patents has indeed disclosed the preparation of thermoprocessable **homopolymer** and some TFE-containing **copolymers** to be useful for **coating electrical cables by melt extrusion** (abstract, line 1-15; column 3, line 8-20; column 4, line 15-24). Such polymers may comprise exactly the same repeating units from the claimed fluorinated dioxole monomer(s) since it is with a specific formula on the abstract as: (A) **$R_{F'}$ being $-OR_F$** wherein R_F is C_{1-5} perfluoroalkyl radical; and (B) X_1 and X_2 are both from F or CF_3 . However, the properties of those homo- and copolymers are quite different from instant polymers.

8. As exactly pointed out by Applicants on page **13** of Remarks, homopolymers made by Navarrini has a Tg temperature around 172 to 84 °C due to the fact that the residual tetrahydrofuran solvent at about 1 wt% being always found to co-exist with purified PD monomer. The existence of tetrahydrofuran will shorten the molecular weight of polymer. In a

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close examination by this Examiner, copolymers made by Navarrini will carry only 0.05 to 3 wt% of dioxole monomer (see abstract, line 1-4). The number is far below the required 95 mole%.

Secondary references Grootaert, Tortelli, Nemser and Bikson, in combination or alone, cannot fix the deficiency of Navarrini as follows: Each of **Grootaert and Tortelli** only discloses that direct fluorine gas treatment can be applied to purify fluoropolymers, particularly some are with dioxole units. By doing so, **unstable ionic groups** (generally are not desirable because of detrimental affects on rheology) **can be substantially removed or in some cases be converted to stable non-ionic groups**.

Each of **Nemser and Bikson** only discloses that gas separation/purification application can be achieved by using such type of perfluorodioxole-containing polymers in the form as membrane. By doing so, gas enrichment can be thereby effectively achieved.

9. It is known in the art that **such a combination of three property factors is quite different from each individual factor in view of criticality**. It is also known in the art that even the difference is only one carbon atom in the composition or a tiny extra step in the making, the final polymeric products can be with very much different properties. Additionally, the present invention has already shown unexpected results in examples along with some comparative examples for making such type perfluorinated polymer (see pages 21-30 for

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examples 1-10 with control examples). Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US Patent No. 4,558,141 to Squire (and its equivalent **EP 080,187 A2**) only disclose a process to prepare some homopolymers and copolymer containing repeating unit of dioxles. However, **R_F** is **NOT limited to OR_F** as well as the Tg temperature of PD homopolymer is only 173.212 °C (column 6, line 63-69).

11. The two key issues on making amorphous perfluorinated homopolymers and copolymers of perfluorodioxoles with (A) **R_F** is **limited to be OR_F** and (B) carrying a **combination of three required properties** as specified, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

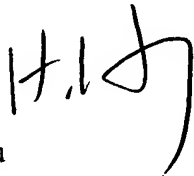
12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the two independent and parent **Claims 14 and 18** are allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claims 15-17 and 19-37** are passed to issue.

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13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

December 7, 2006



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